

Exploration into the Structure of Suicide: A Sociological Autopsy

Greta Slater, Ph.D.
Indiana University
Indianapolis, Indiana

Statement of the Research Problem

Globally, the United States has a moderate rate of suicide, 11.9 per 100,000, with rates in other nations ranging as high as 25 per 100,000 people in Hungary, Scandinavia, Switzerland, Germany, Austria, and Japan to 10 per 100,000 people in the UK, Spain, Italy, Ireland, Egypt and the Netherlands (WHO, 2005). These statistics demonstrate that there is considerable variance in the suicide rates from country to country. There is also considerable variance from region to region and state to state. One key difference between the US and other nations, however, is the rate of gun suicide. The US firearm suicide rate is 1.25 times the next closest nation (Finland) and 200.8 times Japan's firearm suicide rate (Cukier, 1998).

In the United States, suicide is the 11th leading cause of death with firearms being the method of choice for 57 percent of those deaths for men and women combined (CDC, 2002). Between 1990 and 2000, over 181,500 people killed themselves with guns in the United States (CDC, 2002). This rate is 1.7 times the homicide rate in the US and significantly higher than most industrialized countries. The rate of suicide among adults over 65 is the highest of any other age group in the US, claiming the life of around 15 older adults on average per day—5,300 per year—73% of whom use firearms (CDC, 2002). Firearms are the most common method of suicide in the United States for both genders and for each age cohort (CDC, 2002).

While firearm suicide is a significant public health problem, particularly among older adults, the research base is limited. Most of the evidence focuses exclusively on gun suicide and homicide among youth or the general population. This paper focuses on economic, political, and social predictors of suicide with particular emphasis on gun access.

The objectives of this manuscript are as follows:

Explain the relationship of state-level sociological factors (political, economic, status integration, gun policy, and violence climates) in predicting state suicide (overall rates, firearm rates, elder rates, and elder firearm rates)

Present results from the analysis of several structural models of suicide

Outline the implications for future research in social work and suicidology

Research Background and Hypotheses

“Suicide” first entered the English language in 1651 A.D. (Stillion & McDowell, 1996) and has been defined several common ways in the epidemiological and practice literature. Shneidman (1985), the founder of the American Association of Suicidology, delineated the psychosocial elements that appear most often in suicide. He defined suicide as, “...a conscious act of self-induced annihilation, best understood as a multidimensional malaise in a needful individual who defines an issue for which the suicide is perceived as the best solution” (p. 203). Simply put, suicide is the intentional act of taking one’s own life.

Sociological Risk Factors

Emile Durkheim (1897/1985) theorized that sociological variables (e.g., social, political, economic) are more helpful for understanding suicide than individual or psychological explanations. For example, comparisons of economic factors with suicide rates have found that income was inversely related to suicide (Barnes, 1975; Stack, 1980). It has also been demonstrated that suicide was strongly correlated with other types of violence: homicide, domestic battery, and overall crime measures (Kowalski, Fauple, & Starr, 1987; Clarke & Lester, 1989; Stolzenberg & D’Alessio, 2000). Numerous studies link access to lethal means (i.e., firearms or materials for strangulation) with rates of suicide (Conwell et al., 2002; Cukier, 1998; Cutright & Fernquist, 2000; Miller et al., 2002; Romero & Wintemute, 2002; Kellerman et al., 1992; Killias et al., 2001; Wiebe, 2003). Results testing the gun access hypothesis have yielded mixed results, with some studies finding that as gun ownership or availability increased, suicide rates increased (Cukier, 1998; Hemenway, 2004; Hemenway & Miller, 2002; Kellerman et al., 1992; Lester & Murrell, 1980; Lester, 1987; Romero & Wintemute, 2002; Snowden & Harris, 1992), while others find no evidence of this (Cutright & Fernquist, 2000; Kleck, 2004; Lott, 1998). Several studies have made comparisons of gun access and suicide rates for general populations (Cukier, 1998; Killias et al., 2001), or for women specifically (Adamek & Kaplan, 1996; Miller et al., 2002).

Some of the most prominent risk factors associated with suicide and social status integration are: age, gender, marital status (widowhood and divorce specifically), physical health/disability, and occupation. Conceptually, status was defined by Gibbs (1969) as the stability and durability of social relationships within a population. Integration was defined as the extent to which people conform to social expectations for their status and the degree to which people occupy incompatible statuses (Gibbs, 1969; Stack, 1990). McIntosh and colleagues (1994) have pointed out the great difficulties in finding a measure of social status integration/cohesion that covers all possible statuses of individuals in a population. Several articles have provided useful critiques of the status integration model (Schalkwyk, Lazer, & Cumming, 1979; Stack, 1978, 1990; Stafford & Gibbs, 1985, 1988); however these critiques have also missed some of the factors likely to explain elder suicide and firearm suicide.

Missing from the previous research literature are studies examining—either separately or in combination—political, economic, and violence measures. This study extended the previous sociological work on suicide in order to test a theoretical model of

suicide with political, economic, and social predictors of suicide along with two mediators—gun access and violence. Further, this method of analysis—sociological autopsy—has been developed as an extension of the suicidology method of psychological autopsy (Litman, Curphey, Shneidman, Farberow, & Tabachnick, 1963; Weisman & Kastenbaum, 1968) in order to examine key sociological variables in a social, rather than psychological, context.

Research Question

This study examined the following research question: What are the effects of sociological variables on suicide, firearm suicide, elder suicide, and elder firearm suicide? More specifically, the hypotheses tested for each dependent variable (suicide, firearm suicide, elder suicide, and elder firearm suicide) were:

- H 1: Political climate has a direct (+) effect on gun access
- H 2: Political climate has a direct (+) effect on violence climate
- H 3: Political climate has an indirect effect on suicide rates by influencing gun access and violence climate
- H 4: Economic climate has a direct (+) effect on violence climate
- H 5: Economic climate has an indirect effect on suicide rates by influencing gun access and violence climate
- H 6: Gun access and violence are directly related to each other
- H 7: Gun access has a direct (+) effect on suicide
- H 8: Violence climate has a direct (+) effect on suicide
- H 9: The proposed theoretical model is a good fit for the data (see Figure 1)

Methods

The variables for the models included the following: male, divorce, Political Climate (FEC-R), Economic Climate (ECI), Gun Access (GAS-R), and Violence Climate (VCI-R). Secondary data were collected from each state (N=50). FEC-R data were obtained from the Federal Election Commission. FEC-R used to measure the level of Republicans (who tend to support gun rights) and was coded as the percent voting for the Republican candidate in each of the last four US Presidential elections (1992, 1996, 2000, & 2004). Factor analysis was used to develop a scale for this measure. The factor loadings for the Political Climate Scale are included in Table 1.

The indicators used for measuring economic climate in the present study were derived from the scales used by others (Gastil, 1971; Hackney, 1969; Loftin & Hill, 1974). Most previous research has focused on state-level analysis (Gastil, 1971; Hackney, 1969; Kuncie & Anderson, 2002; Loftin & Hill, 1974; Parker & Smith, 1979; and Smith & Parker, 1980), which was the level of analysis chosen for the present study. Economic climate has been measured by Loftin and Hill (1974) using a six-item scale including: infant mortality rate, percent of the population who are illiterate, percent of families with income below the poverty level, percent living in single parent-headed households, percent of Armed Forces Mental Test failures, and percent of people with

less than a high school education. Their measure, called the Structural Poverty Index, has demonstrated adequate reliability: $\alpha=0.893$ (Parker & Smith, 1979) and $\alpha=0.846$ (Loftin & Hill, 1974). ECI data in the present study were a five-indicator measure of economic climate that included literacy, education, poverty, disability, and single-headed households. The factor loadings for ECI are included in Table 2. Separate measures were used for Elder Economic Climate (EECI) when analyzing elder suicide and elder firearm suicide. Those included literacy, education, elder poverty, elder disability, and retirement status. The factor loadings for EECI are included in Table 3.

Gun access is somewhat tricky to study, because there are no standard, widely agreed upon measures for availability. For example, gun availability has been measured with proxies such as rate of Guns & Ammo magazines sold per capita (Duggan, 2003), rates of gun suicides (Brent, Perper, & Allman, 1987; Cook & Ludwig, 2003; Cutright & Fernquist, 2000; Lester, 1989; Miller, Azarel, & Hemenway, 2002), and rates of gun homicides (Killias, van Kesteren, & Rindlisbacher, 2001; Lester, 1989; Miller, Azarel, & Hemenway, 2002.) The GAS-R measure in the present study was a six-item index of the leniency of gun laws including child safety locks, concealed weapons laws, attorney general regulations, background and waiting periods, secondary sales laws, and child access prevention laws. The factor loadings for GAS-R are included in Table 4.

The VCI-R data were the Uniform Crime Report (Index of Violent Crime) which included homicide, rape, battery, and robbery. Factor and reliability analyses were conducted for each scale/index (FEC-R, ECI, EECI, and GAS-R). A two-step process recommended by Anderson and Gerbing (1988) was used to test the mediational models of suicide. Confirmatory factor analyses (CFA) were performed first to develop an acceptable measurement model, followed by the testing of the structural model. Maximum likelihood (ML) estimation was conducted using AMOS 5.0 (Arbuckle, 1997).

Results

The results of the factor and reliability analyses were favorable. The Political Climate measure (FEC-R) revealed a one-factor solution that explained 71.19% of the variance. The KMO was .774 and Bartlett's test was significant ($\chi^2 = 98.18$, $p < .001$) for this measure. The reliability alpha for FEC-R was .840 ($M=.464$, $Var=.006$.) Similarly, the Economic Climate measure (ECI) was reliable and valid; the KMO was .739 and Bartlett's test was significant ($\chi^2 = 204.582$, $p < .001$) and a one-factor solution explained 78.60 % of the variance. Similarly, the Elder Economic Climate Scale factor analysis revealed a one-factor solution that explained 78.6 % of the variance. The reliability alpha for ECI was .917 ($M=.142$, $Var=.004$.) and the alpha for Elder Economic Climate Scale was .921, which is consistent with previously reported reliability alphas for the Structural Poverty Index (Loftin & Hill, 1974). The Structural Poverty Index has been reported as having a reliability ranging from $\alpha=.77$ (Holbrook & Van Dunk, 1993) to $\alpha=.87$ (Bibby & Holbrook, 1996), $\alpha=.846$ (Loftin & Hill, 1974) to $\alpha=.893$ (Parker & Smith, 1979) indicating a satisfactory level of reliability. The correlations of Loftin and Hill's (1974) measure with the ones used in the present study were very strong; Economic Climate Scale ($\alpha=.994$) and Elder Economic Climate Scale ($\alpha=.981$). The mean inter-item correlation for Economic Climate Scale was .847 and for the Elder Economic Climate Scale was .784. The Gun Access measure (GAS-R) was also helpful. A one-factor

solution explained 58.8% of the variance and the reliability alpha was .855 ($M=1.204$, $Var=.096$). The KMO was .779 and Bartlett's test was significant ($\chi^2 = 140.22$, $p < .001$) for GAS-R as well.

Four models were tested with separate dependent variables. Model I-R was tested for the ability to predict suicide rates overall and the Model II-R was tested with firearm suicide rates overall. The third model, Model III-R used elder suicide data as the dependent variable and the fourth (Model IV-R) tested the predictive power of the model for elder firearm suicide rates specifically. The tests of the structural models yielded a very good fit for each model (see Table 5).

The second model, which included overall gun suicide rates (Model II-R) had the best overall results: $\chi^2(9, N=50) = 5.279$ (CMIN) $p=.809$ indicating an excellent fit of the data and theoretical model. The model explained 76% of the variance in state suicide rates overall and was a significantly better predictor than one could expect by chance ($F(6,43)=22.889$, $p<.001$). All of the path coefficients were statistically significant predictors with the exception of the path from Violence Climate (VCI-R) to suicide (see Figure 1). Similarly, the other models were also a good fit for the data (see Table 1) and had similar results as Model II-R. The models with elder suicide and elder firearm suicide (Models III-R and IV-R) were not as helpful in predicting suicide among the elder population, but those models still resulted in an explained variance of 53%.

The findings from the present study were clearly in line with the previous theory about divorce and gender. Both have been well established risk factors both in individual experimental studies and in aggregate cross-sectional designs (Conwell et al., 2002; de Leo et al., 2001; Luoma & Pearson, 2002; Kaprio, Koskenvuo, & Rita, 1987; McIntosh et al., 1994; Trovato, 1991). What was particularly significant was the magnitude of these two variables in the theoretical models. Male gender had significant predictive power directly on suicide overall, gun suicide, and elder suicide, but not elder gun suicide. The results for divorce involve some puzzling findings. Divorce was found to have a significant effect on gun access. In fact, the variable (divorce) explained 40.7 percent of the differences in gun legislation and had discernable indirect effects on suicide through gun access.

Poverty (ECI), Violence (VCI-R), Partisanship (SEC-R), divorce, gender, and gun access (GAS-R) were found to be significant predictors of suicide, explaining 76% of the variance in suicide and firearm suicide rates for the general population. Political Climate (Federal Election Commission-Revised and PCS-R) was hypothesized to have a direct (+) effect on gun access and this hypothesis was strongly supported. As the percent of people who voted Republican in the last four Presidential elections (Federal Election Commission-Revised) increased, access to guns increased ($\beta = .547$, $C.R. = -6.058$, $p < .001$).

Economic climate was hypothesized to have a direct (+) effect on violence in the present study. This hypothesis was strongly supported by the data. Violence climate was directly related to the measures of poverty chosen for this study (Economic Climate Scale and Elder Economic Climate Scale). Regression analysis demonstrated that Economic Climate Scale accounted for 44.2 percent of the differences in violence climate and Elder Economic Climate Scale explained 43.1 percent of the variance in violence climate for the models involving suicide rates. The most helpful indicators for predicting violence was literacy and poverty among the general population and literacy, retirement, and

disability status among elders. The explanatory power was more pronounced when dealing with firearm suicide. Economic Climate Scale and Elder Economic Climate Scale, for example, were helpful in explaining 61.2 and 60.1 percent of the respective differences in violence climate (Violence Index-R) from state to state.

The political climate hypothesis was supported, because the relationship of SEC-R was found to be indirectly related to suicide by influencing the access to guns. Federal Election Commission-Revised was found to directly influence gun access and was the most significant predictor of gun access in the portion of the mediational model where gun access is the criterion. The strength of support for the Republican candidate the Presidential elections (Federal Election Commission-Revised) was directly related to higher scores (easier access) on the Gun Access Scale ($\beta = -.55$, C.R. = -6.058, $p < .001$) and the indirect effects of political influence on gun access was also something important to notice. Federal Election Commission-Revised explained nearly 18.5 percent of the differences in suicide and 15.8 percent of the differences in elder suicide by itself, because of the influence it had on gun access. When discussing firearm suicide rates, the influence is much greater: 30.5 percent for firearm suicide and 21.9 percent for elder firearm suicide. This makes it even more salient to take notice of the political action committees' power in state and federal elections.

The most significant finding was the strength of the relationship of gun access with suicide. Gun access (GAS-R) directly (alone) 33.9 percent of the differences in suicide rates, 55.4 percent of the gun suicide rates, 40.5 percent of the elder suicide rates, and 29.2 percent of the elder gun suicide rates. States with more lenient gun laws had much higher rates of suicide, firearm suicide, elder suicide, and elder firearm suicide.

Utility for Social Work Practice

Comprehensive theory development

The present study is important for several key reasons. First, comprehensive theory development is necessary to address the complex issue of firearm suicide in the United States. The increasing number of elders who die by suicide has pressing implications for practice, policy-making, education and research. Social workers are trained to think systemically, to work with people in their environment, to research multilevel social problems, and to advocate for people whose needs are not getting met by the larger society. Elder firearm suicide is a strong example of a preventable public health issue facing our society. For example, many older adults attempt suicide in Indiana because they are lonely or physically declining (Shen, 2002) and this is likely due to the lack of services and suicide prevention programs in the state. Firearm access is a policy issue that can also be addressed by social workers. Research demonstrates that restricting means significantly reduces the rates of suicide. "Evidence from many countries and cultures shows that limiting access to lethal means of self-harm may be an effective strategy to prevent self-destructive behaviors" (National Mental Health Information Center, 2003, p. 3). While there are many programs aimed at preventing youth suicide (Jenkins & Kovess, 2002; Lester & Yang, 1994; O'Connor, Sheehy, & O'Connor, 1999), there are few programs geared toward preventing suicide among the oldest group (McIntosh et al., 1994). This study contributes to the theoretical knowledge base by

adding a comprehensive framework of analysis and a predictive model useful for prevention.

International prevention context

A second reason this present study is significant is that the international suicide prevention context is ripe for change and exposure of the problem through research is the first step in reducing and preventing suicide. Several international efforts have been developed to research, design, and implement social policy in order to reduce the public health problem leading to so many suicide fatalities. Several countries have developed national and international prevention projects. The Office for National Statistics' national database of deaths from drug poisoning and overdose in England and Wales (Shah, Uren, Baker, & Majeed, 2002) and the Prevention of Suicide publication (Department of Health, UK, 1994) are two such examples. Finland also has a national prevention effort aptly titled, The National Suicide Prevention Project (Aro & Henriksson, 1995) with a goal of reducing the number of suicides in the country by 20 percent in the next 10 years. This is important for firearm suicide research because Finland's suicide rates are among the highest in the world, reaching approximately 44.9 deaths per 100,000 residents in 1993 and half of Finnish households own guns (Cukier, 1998). Australia has a similar project, the National Plan for Suicide Prevention Project, with a goal of reducing the suicide rate by 15 percent over 20 years (Snowdon & Baume, 2002). The United Nations (2003) has outlined critical arenas in the area of aging population research, including: social participation and integration, macro-societal change and development, healthy ageing, physical and mental functioning, and policy process evaluation. These research areas have not been widely emphasized in the US, but there have been important developments internationally that can inform US efforts.

US prevention context

The third reason the present study is important, is that the United States may becoming ready for changes in the methods of prevention. The former Surgeon General, Dr. David Satcher called suicide a "major public health problem" (US Public Health Service, 1999) and designed an initiative with 11 goals and 68 objectives designed to create 'cultural change' in the US regarding suicide. The National Strategy is the largest US attempt to formulate policy on this issue. The National Strategy has led to the allocation of new resources for program development, research, and education on the issue of suicide prevention. Epidemiologic data indicate that not only are elders at the highest risk for suicide, but their risk profile differs from younger groups. Continued research is needed in order to better understand where and how elders obtain their weapons and how to best reach them before the point of gun suicide. It would also be helpful to conduct large, experimental studies that could separate the interactive effects of gun policy and prevention programs on suicide rates.

The fourth reason this study was needed is because there has been so little research on the ways that the gun culture, gun policy, and gun access has affected the suicide rates among elders, the firearm suicide rates among the general population, and overall suicide rates. The HELP network, a grassroots advocacy organization directed at

reducing gun violence in the United States has stated that our acceptance of gun violence has passed the stage of “epidemic” proportions and we are now experiencing an “endemic” phenomenon of gun violence in our lives. The press release was made shortly after the release of the 2002 mortality data in which HELP stated, “Endemic disease is always present in an area: diseases are epidemic when they are rising well above historic levels” (HELP Network, 2005, p. 1). The US culture values an individual’s right to bear arms despite significant evidence of increased rates of collective violence. One bi-product of a high firearm death rate is that around 80 people die from firearm injuries per day, including 46 gun suicides and 11 elder gun suicides (CDC, 2002; Gun Control Network, n.d.).

The US has a serious problem with suicide and other forms of violence, but researchers, policymakers, and advocates (both for gun rights and gun control) differ in the best approach for reducing this violence. Some argue that increased gun ownership reduces crime (Lott, 1998) and that previous research about guns and crime was not credible (Kleck, 2004). Others argue that the US’s irresponsible gun policies not only affect violence within the United States, but around the world through legal and illegal trafficking from the US to other countries (Cukier, Sarkar, & Quigley, 2000).

Future Research

Future directions in suicide research should include large studies of elders and how they acquire guns. It would also be helpful to conduct exploratory research with African American elder women, who have the lowest rates of suicide, to learn about the protective factors operating in their lives. Policy-based research could also include improved measures of gun access, such as the effects of restrictive policies on gun buying behaviors and changes in state-level suicide rates. Comprehensive, theory-building research is the first step toward developing adequate gun policies and suicide prevention programs. Through a deeper understanding of the ways our gun culture influences violent self-harm, we can outline evidence-based practice, design protective policies, and design adequate prevention programs.

References

- Adamek, M., & Kaplan, M. (1996). The growing use of firearms by suicidal women, 1979-1992. *Suicide and Life-Threatening Behavior*, 26, 71-78.
- Anderson, J.C. & Gerbing, D.W. (1998). Structural equation modeling in practice: A review and two step approach. *Psychological Bulletin*, 103, 411-423.
- Arbuckle, J. (1997). *AMOS user's guide*. Chicago: SmallWaters.
- Aro, A., & Henriksson, M. (1995). Fear of AIDS and suicide in Finland: A review. *AIDS Care*, 7, (5), 187-198.
- Barnes, C. B. (1975). The partial effect of income on suicide is always negative. *American Journal of Sociology*, 80, 1454-1460.
- Bibby, J. F., & Holbrook, T. M. (1996). Parties and elections. In V. Gray & H. Jacob (Eds.), *Politics in the American states: A comparative analysis*, 6th Ed, (pp. 78-121). Washington, DC: Congressional Quarterly Press.
- Brent, D. A., Perper, J. A., & Allman, C. J. (1987). Alcohol, firearms, and suicide among youth. *Journal of the American Medical Association*, 257, 3369-3372.
- Centers for Disease Control and Prevention, (2002). National Vital Statistics Reports, 50, (15), 1-120.
- Clarke, R.V. & Lester, D. (1989). *Suicide: Closing the exits*. New York: Springer Verlag.
- Conwell, Y., Duberstein, P., Connor, K., Eberly, S., Cox, C., & Caine, E. (2002) Access to firearms and risk for suicide in middle-aged and older adults. *American Journal of Geriatric Psychiatry*, 10, 407-416.
- Cook, P. J., & Ludwig, J. (2003). Guns and burglary. In J. Ludwig and P. J. Cook (Eds.). *Evaluating gun policy: Effects on crime and violence* (pp. 74-107). Washington, DC: The Brookings Institution.
- Cukier, W. (1998). Firearms Regulation: Canada in the International Context. *Chronic Diseases in Canada*. 19, 25-33.
- Cukier, W., Sarkar, T., & Quigley, T. (2000). Firearm regulation: International law and jurisprudence. *Canadian Law Review*, 6 (1), 99-123.
- Cutright P. & Fernquist R. (2000). Firearms and suicide: the American experience, 1926-1996. *Death Studies*, 24, 705-719.
- de Leo, D., Padonani, W., Scocco, P., Lie, D., Bille-Brahe, U., Arensman, E., Hjelmeland, H., Crepet, P., Haring, C., Hawton, K., Lonnqvist, J., Michael, K., Pommereau, X., Querejeta, I., Phillipe, J., Salander-Redenberg, E., Schmidtke, A., Fricke, S., Weinacker, B., Tamesvary, B., Wasserman, D., & Faria, S. (2001). Attempted and completed suicide in older subjects: Results from the WHO/EURO Multicentre study of suicidal behavior. *International Journal of Geriatric Psychiatry*, 16, 300-310.
- Department of Health, UK (1994). *The prevention of suicide*. HMSO, London.
- Durkheim, E. (1897/1985). *Le suicide: 'Etude de sociologie*. [*Suicide: A sociological study*] (M. Thompson & K. Thompson, Trans.). New York: New York Free Press. (original work published in 1897).
- Gastil, R. P. (1971). Homicide and a regional culture of violence. *American Sociological Review*, 36, 412-427.
- Gibbs, J. (1969). Marital status and suicide in the United States: A special test of the status integration theory. *American Journal of Sociology*, 74, 521-533.

- Gun Control Network. (n.d.). Retrieved on 3/30/03 from: <http://gun-control-network.org/facts.html>
- Hackney, S. (1969). Southern violence. In H. G. Graham and T. R. Gurr (Eds.), *Violence in America* (pp. 479-500). New York: Signet.
- HELP Network. (2003). National data. Retrieved on 2/25/03 from: <http://www.helpnetwork.org/frames/fact.state5.html>
- Hemenway, D. (2004). *Private guns public health*. Ann Arbor: University of Michigan Press.
- Hemenway, D., & Miller, M. (2002). Association of rates of household handgun ownership, lifetime major depression, and serious suicidal thoughts with rates of suicide across US census regions. *Injury Prevention*, 8, 313-316.
- Holbrook, T. M., & Van Dunk, E. (1993). Electoral competition in the American states. *The American Political Science Review*, 87 (4), 955-962.
- Jenkins, R., & Kovess, V. (2002). Evaluation of suicide prevention: A European approach. *International Review of Psychiatry*, 14, 34-41.
- Kaprio, J., Koskenvuo, M., & Rita, H. (1987). Mortality after bereavement: A prospective study of 95,647 widowed persons. *American Journal of Public Health*, 77 (3), 283-287.
- Kellermann A.L., Rivara F.P., Somes G., Reay D.T., Francisco J., Banton J.G., Prodzinski J., Fligner C., & Hackman B.B. (1992). Suicide in the home in relation to gun ownership. *New England Journal of Medicine*, 327, 467-473.
- Killias, M., van Kesteren, J & Rindlisbacher, M. (2001). Guns, violent crime, and suicide in 21 countries. *Canadian Journal of Criminology*, 43, 429-448.
- Kleck, G. (2004). Measures of gun ownership levels of macro-level crime and violence research. *Journal of Research in Crime and Delinquency*, 41, 3-36.
- Kowalski, G., Faupel, C., and Starr, P. (1987). Urbanism and suicide: A study of American counties. *Social Forces*, 66 (1), 85-101.
- Kunce, M., & Anderson, A. (2002). The impact of socioeconomic factors on state suicide rates: A methodological note. *Urban Studies*, 39 (1), 155-162.
- Lester, D. (1987). Availability of guns and the likelihood of suicide. *Sociology and Social Research*, 71, 287-288.
- Lester, D. (1989). *Suicide: Closing the exits*. New York: Springer-Verlag.
- Lester, D., & Murrell, M. (1980). The influence of gun control laws on suicidal behavior. *American Journal of Psychiatry*, 137, 121-122.
- Lester, D., & Yang, B. (1992). Social and economic correlates of the elderly suicide rate. In A. Leenaars, R. Maris, J. McIntosh & J. Richman (Eds.), *Suicide and the Older Adult*, (pp. 36-47). New York: Guilford.
- Litman, R.E., Curphey, T., Shneidman, E. S., Farberow, N. L., & Tabachnick, N. (1963). Investigations of equivocal suicides. *Journal of the American Medical Association*, 184, 924-929.
- Loftin, C. & Hill, R. (1974). Regional subculture and homicide: An examination of the Gastil-Hackney thesis. *American Sociological Review*, 39, 714-724.
- Lott, J. (1998). *More guns, less crime*. Chicago: University of Chicago Press.
- Luoma, J., & Pearson, J. (2002). Suicide and marital status in the United States 1991-1996: Is widowhood a risk factor? *American Journal of Public Health*, 92 (9), 1518-1522.

- McIntosh, J.L., Santos, J.F., Hubbard, R.W., & Overholser, J.C. (1994). *Elder suicide: Research, theory, and treatment*. Washington, DC: American Psychological Association.
- Miller, M., Azarel, D., & Hemenway, D. (2002). Firearm availability and suicide, homicide, and unintentional death among women. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 79 (1), 26-38.
- National Mental Health Information Center. (2003). *Challenging stereotypes: An action guide*. Retrieved 1/27/03 from: <http://www.mentalhealth.org/publications/allpubs/SMA01-3518/default.asp>
- O'Connor, R., Sheehy, N., & O'Connor, D. (1999). The classification of completed suicide into subtypes. *Journal of Mental Health*, 8, (6), 629-637.
- Parker, R. N. & Smith, M. D. (1979). Deterrence, poverty, and type of homicide. *American Journal of Sociology*, 85, 614-624.
- Romero, M., & Wintemute, G. (2002). The epidemiology of firearm suicide in the United States. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 79 (1), 39-48.
- Schalkwyk, J., Lazer, C., & Cumming, E. (1979). Another look at status integration and suicide. *Social Forces*, 57, (4), 1063-1080.
- Shah, R., Uren, Z., Baker, A., & Majeed, A. (2002). Trends in suicide from drug overdose in the elderly in England and Wales, 1993-1999. *Journal of Geriatric Psychiatry*, 17, 416-421.
- Shen, X. (Sept. 27, 2002). A closer look at suicide in Indiana. Presentation made to the Indiana Partnership to Prevent Firearm Violence annual meeting: Suicide prevention, a call to action. Indianapolis, IN.
- Shneidman, E. (1985). *Definition of suicide*. New York: Wiley.
- Shenassa, E., Catlin, S., & Buka, S. (2003). Lethality of firearms relative to other suicide methods: A population-based study. *Journal of Epidemiology, & Community Health*, 57, (2), 120-125.
- Smith, M. D., & Parker, R. N. (1980). Type of homicide and variation in regional rates. *Social Forces*, 59, 136-147.
- Snowdon, J., & Baume, P. (2002). A study of older people in Sydney. *International Journal of Geriatric Psychiatry*, 17, 261-269.
- Snowdon, J., & Harris, L. (1992). Firearm suicides in Australia. *Medical Journal of Australia*, 156, 79-83.
- Stack, S. (1978). Suicide: A comparative analysis. *Social Forces*, 57, (2), 644-653.
- Stack, S. (1980). The effect of marital dissolution on suicide. *Social Forces*, 57, 644-653.
- Stack, S. (1990). New micro-level data on the impact of divorce on suicide, 1959-1980. A test of two theories. *Journal of Marriage and the Family*, 52, 119-127.
- Stafford, M., & Gibbs, J. (1985). A major problem with the theory of status integration and suicide. *Social Forces*, 63, (3), 643-660.
- Stafford, M., & Gibbs, J. (1988). Change relation between marital integration and suicide rates. *Social Forces*, 66, (4), 1060-1079.
- Stillion, J., & McDowell, E. (1996). *Suicide across the lifespan*. Bristol, PA: Taylor & Francis.
- Stolzenburg, L., and D'Alessio, S. (2000). Gun availability and violent crime. *Social Forces*, 78, 1461-1482.

- Trovato, F. (1991). Sex , marital status, and suicide in Canada: 1951-1981. *Sociological Perspectives*, 34 (4), 427-445.
- US Public Health Service, (1999). *The Surgeon General's Call to Action to Prevent Suicide*. US Government Printing Office: Washington, DC.
- Wiebe, D. (2003). Homicide and suicide risks associated with firearms in the home: A national case-control study. *Annals of Emergency Medicine*, 41, 6, 771-782.
- Weisman, A. D., & Kastenbaum, R. (1968). *The psychological autopsy: A study of the terminal phase of life*. New York: Behavioral Publications. [Community Mental Health Journal Monograph No.4.]
- World Health Organization [WHO]. (2005). Suicide prevention and special programmes. Retrieved on 6/16/05 from http://www.who.int/mental_health/prevention/suicide/en/Figures_web0604_table.pdf

Appendix

Figure 1. Structural Model of Suicide (Model II-R)

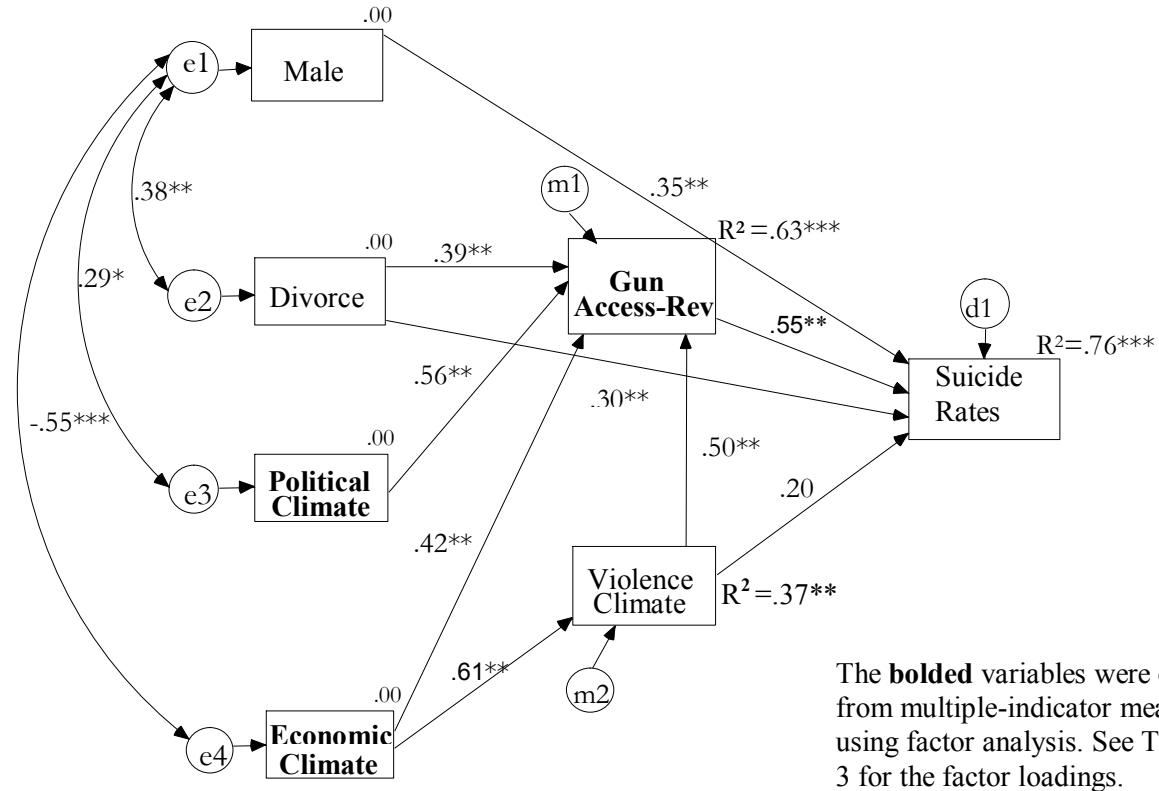


Table 1. Component Matrix (Federal Election Commission-Revised)

	<i>Factor loading</i>	<i>h²</i>	<i>M</i>	<i>SD</i>
Federal Election Commission Results 2000	.898	.807	.504	.087
Federal Election Commission Results 1996	.735	.540	.423	.070
Federal Election Commission Results 1992	.890	.792	.382	.050
Federal Election Commission Results 1988	.842	.709	.545	.055

Table 2. Component Matrix (Economic Climate Scale)

	<i>Factor loading</i>	<i>h²</i>	<i>M</i>	<i>SD</i>
Single parent	.941	.885	.043	.014
Education	.947	.897	.180	.044
Literacy	.906	.821	.179	.046
Poverty	.890	.792	.116	.030
Disability	.917	.840	.191	.028

Table 3. Component Matrix (Elder Economic Climate Scale)

	<i>Factor loading</i>	<i>h²</i>	<i>M</i>	<i>SD</i>
Retirement	.854	.730	.350	.036
Education	.960	.921	.180	.044
Literacy	.901	.811	.179	.046
Elder poverty	.897	.804	.094	.027
Elder Disability	.815	.664	.422	.045

Table 4. Component Matrix (Gun Access Scale-Revised)

	<i>Factor loading</i>	<i>h²</i>	<i>M</i>	<i>SD</i>
Child Access (CAP)	.667	.445	1.068	1.374
Child Safety Locks (CSL)	.815	.665	.696	1.218
Preemption/Attorney General's power (P/AG)	.638	.407	1.170	1.480
Secondary Sales (SES)	.894	.799	1.262	1.527
Concealed Weapons (CCW)	.752	.565	1.460	1.440
Background & Waiting (B& W)	.804	.646	1.566	1.451

Table 5. Selected Fit Indices for Structural Models

	CMIN	<i>p</i>	GFI	AGF I	RMSE A	Lower % CI	Upper % CI	<i>p</i>	AIC	Sat.	Indep.	Variance Explained
Expected Range with desired result close to * asterisked number		0-1*	0-1*	0-1*	*0-1	RMSEA needs to be between upper and lower CI		0-1*	AIC needs to be between saturated and independence models			0-1*
Overall Suicide (Model I-R)	χ^2 (9, N=50) = 4.751	.855	.973	.915	.000	.000	.088	.897	42.75	56.00	183.40	76%
Gun Suicide (Model II-R)	χ^2 (9, N=50) = 5.279	.809	.970	.972	.000	.000	.102	.861	43.28	56.00	201.72	76%
Elder Suicide (Model III-R)	χ^2 (9, N=50) = 5.409	.830	.971	.910	.000	.000	.096	.877	43.05	56.00	165.21	53%
Elder Gun Suicide (Model IV-R)	χ^2 (9, N=50) = 5.419	.796	.969	.904	.000	.000	.105	.851	43.42	56.00	168.89	53%